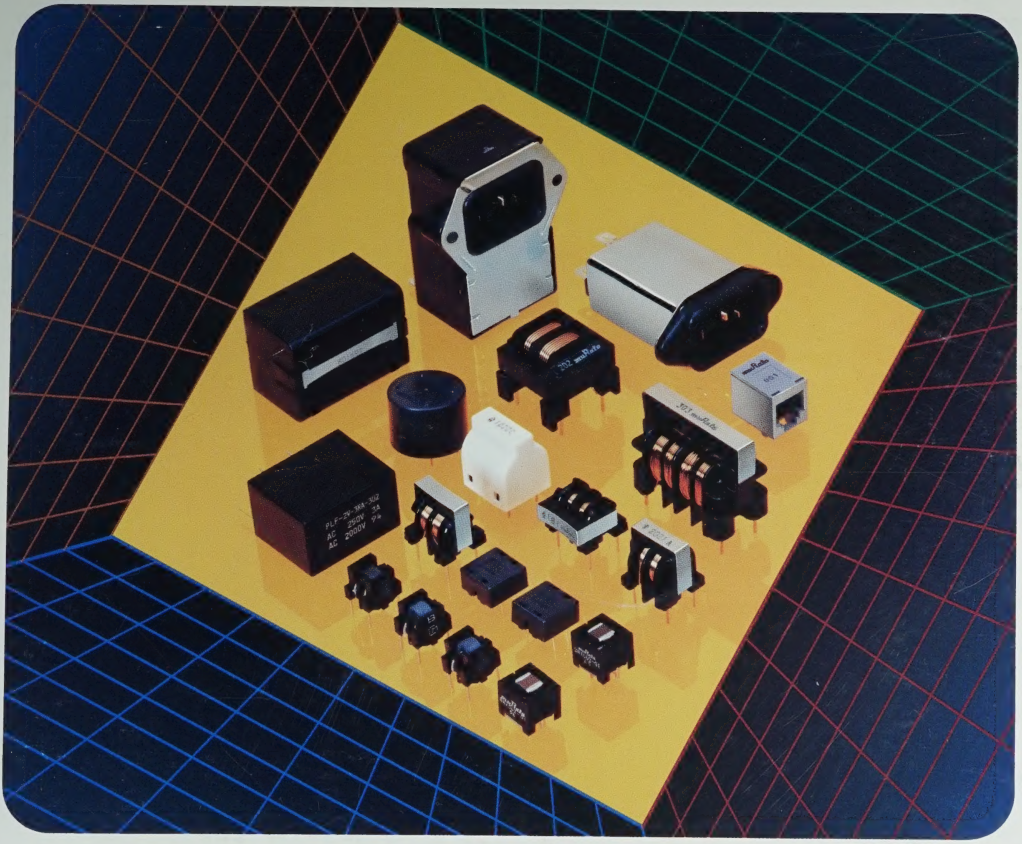
# AC POWER LINE FILTERS

## for Printed Circuit Board Application

CATALOG NO. E-02-B



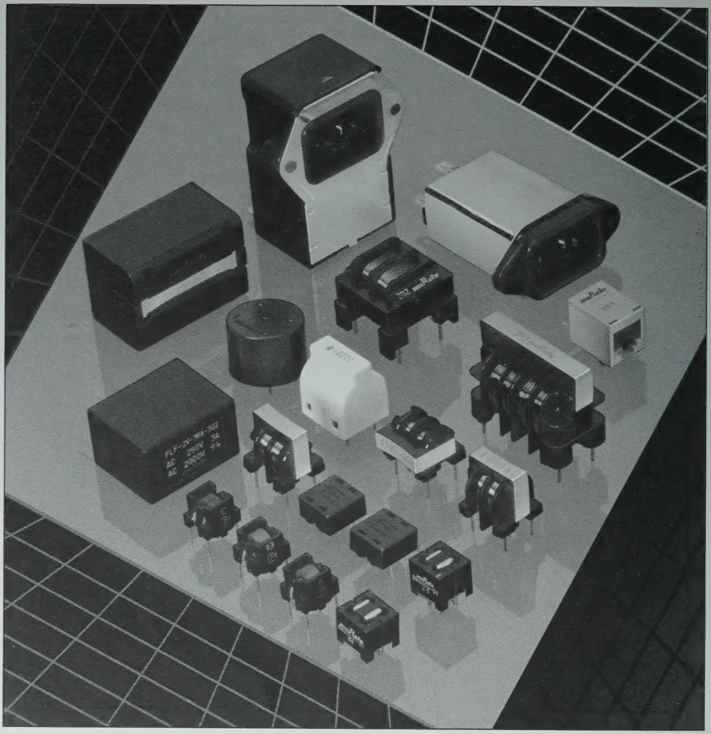
MURATA ERIE NORTH AMERICA

MURATA ERIE

Murata Erie manufactures power line filters based on years of experience in ceramic and ferrite technologies.

Murata Erie provides a line of highly reliable filters for a wide range of applications including sophisticated space systems and consumer products such as TV's, radios and computers.

Please contact the nearest Murata Erie Sales Office for additional power line filters information and technical services.



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# EMI SUPPRESSION FILTER KITS

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## EKO Series

Today, most designers find that there is just no way around using trial and error to select EMI filters. So, to help them do this as systematically as possible, we have created sample kits of AC Line filters housed in a plastic case. Our power line filter sample kit is for any application of EMI power line filtering.

### SURFACE MOUNT CHIPS—Part No. EK115A

| No. | Part Number | QTY | Description | | No. | Part Number | QTY | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | BLM21B03 | 20 | Chip Solid Inductor | | 10 | NFM41R00C221 | 40 | Chip EMI Suppression Filter Solid type |
| 2 | BLM21A05 | 100 | | | 11 | NFM41R00C471 | | |
| 3 | BLM31A02 | | | | 12 | NFM41R10C102 | | |
| 4 | BLM32A06 | | | | 13 | NFM41R10C222 | | |
| 5 | BLM32A07 | | | | 14 | NFM41410C223 | | |
| 6 | BLM41A01 | | | | 15 | NFM61R00T361 | 20 | Chip EMI Suppression Filter |
| 7 | NFM41R00C220 | 40 | Chip EMI Suppression Filter Solid type | | 16 | NFM61R10T102 | | |
| 8 | NFM41R00C470 | | | | 17 | NFM61R20T332 | | |
| 9 | NFM41R00C101 | | | | | | | |

### POWER LINE—Part No. EK025B

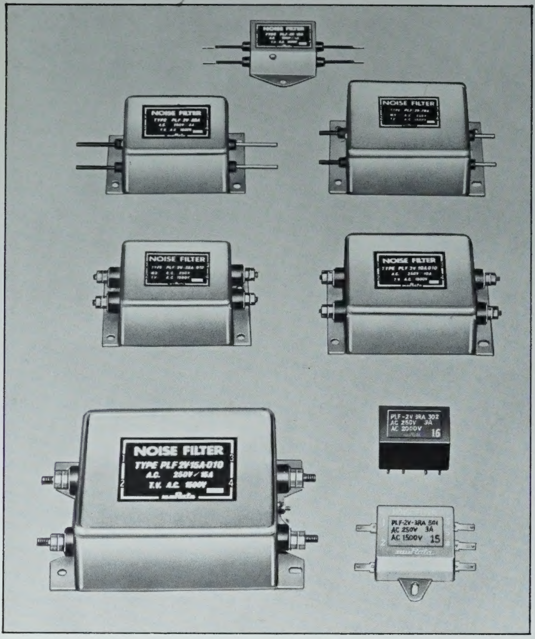
| No. | Part Number | QTY | Description | | No. | Part Number | QTY | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | PLA1022A | 2 | Compact Common Mode Choke Coil, Non-Case Type | | 13 | DSR1150-56 E472M VA2-EA | 10 | Safety Standard Recognized EMIFIL® For AC Power Supplies |
| 2 | PLA3021A | 2 | | | 14 | DSR1100-56 FZ472P VA2-EA | 10 | |
| 3 | PLA5021A | 2 | | | 15 | PLI-A0302 | 1 | Noise Filter For AC Line Applications |
| 4 | PLA8021C | 2 | Case-Type | | 16 | PLI-C1030 | 1 | |
| 5 | PLH11L-6003R3 | 2 | High Frequency Common Mode Choke Coil | | 17 | PLI-D0303 | 1 | |
| 6 | PLA1511R5 | 2 | | | 18 | PLI-E0303 | 1 | |
| 7 | PLE25H-1531R | 1 | Common Mode Choke Coil | | 19 | PLI-S0303 | 1 | |
| 8 | PLE25H-2023R | 1 | | | 20 | PLF-C1030 | 1 | |
| 9 | PLC20LD-3031R | 1 | | | 21 | PLT1R53C | 5 | Common Mode Choke Coil |
| 10 | PLC20HD-7030R5 | 1 | | | 22 | BNX002-01 | 5 | DC Power Line Filter |
| 11 | DSR1100-56 E22M VA2-EA | 10 | Safety Standard Recognized EMIFIL® For AC Power Supplies | | 23 | BL02RN2-R62 | 50 | Ferrite Bead |
| 12 | DSR1120-56 E302M VA2-EA | 10 | | | | | | |

### COMPUTING DEVICE—Part No. EK015C

| No. | Part Number | | QTY | Description | | No. | Part Number | | QTY | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BNX002-01 | | 3 | DC Powerline Filter | | 19 | DSS306-55Y5S471M | 100V | 50 | 3 Lead Disc Filter With Ferrites |
| 2 | BNP002-03 | | 3 | Signal Line Filter | | 20 | DSS306-55Y5S102M | 100V | 50 | |
| 3 | DF221-601SS152GMV50 | | 30 | Subminiature Semiconductor | | 21 | DSS306-55Y5U222Z | 100V | 50 | |
| 4 | BL01RN1-A62 | | 50 | Ferrite Bead Inductors | | 22 | DSS306-55FZ103N | 100V | 50 | |
| 5 | BL02RN2-R62 | | 50 | | | 23 | DSS306-55F223Z | 16V | 50 | |
| 6 | BL03RN2-R62 | | 50 | | | 24 | DS310-55Y5S223S | 50V | 20 | 3 Lead Disc Filter |
| 7 | BLM31A02 | | 20 | Chip Ferrite Bead | | 25 | DS310-55Y5S104M | 16V | 20 | |
| 8 | BLM41A04 | | 20 | | | 26 | DSS310-55Y5S2220M | 100V | 20 | 3 Lead Disc Filter With Ferrites |
| 9 | DS306-55Y5S470M | 50V | 20 | 3 Lead Disc Filter | | 27 | DSS310-55Y5S470M | 100V | 20 | |
| 10 | DS306-55Y5S101M | 50V | 20 | | | 28 | DSS310-55Y5S101M | 100V | 20 | |
| 11 | DS306-55Y5S271M | 50V | 20 | | | 29 | DSS310-55Y5S271M | 100V | 20 | |
| 12 | DS306-55Y5S102M | 50V | 20 | | | 30 | DSS310-55Y5S222M | 100V | 20 | |
| 13 | DS306-55Y5S222M | 50V | 20 | | | 31 | DSS310-55Y5S223S | 100V | 20 | |
| 14 | DS306-55FZ103Z | 50V | 20 | | | 32 | DSS710-D223S12-22 | | 5 | Varistor/Capacitor |
| 15 | DSS306-55Y5S220M | 100V | 50 | 3 Lead Disc Filter With Ferrites | | 33 | NFV610-655T2A106 | 100V | 5 | Noise Suppression Filter |
| 16 | DSS306-55Y5S470M | 100V | 50 | | | 34 | NFV610-655T2A206 | 100V | 5 | |
| 17 | DSS306-55Y5S101M | 100V | 50 | | | 35 | NFV610-655T2A506 | 100V | 5 | |
| 18 | DSS306-55Y5S221M | 100V | 50 | | | 36 | NFV610-655T2A107 | 100V | 5 | |

# NOISE FILTERS
# for AC LINE APPLICATIONS

## PLF Series



Due to the various types of electronic devices and equipment which are now in wide use, the problems of malfunction and noise, originating from so-called "electro-magnetic interference," have recently been the focus of a great deal of attention. This has brought about a keen demand for noise-free and fail-safe electronic devices, that is, equipment with a high degree of electro-magnetic compatibility (EMC). There is a worldwide governmental trend to impose upon electronic items various legal restrictions to eliminate electro-magnetic interference (i.e. FCC, FTZ and VDE).

Inputs or outputs from the power supply sources are examples of complicated noise origins. AC noise filters are available to prevent such noise. (They may be made compatible with DC power supply sources in some applications.)

### FEATURES

- **Effective for noise suppression in both normal mode and common modes.**
- **Safe, reliable design.**
- **The 300 Series and 500 Series are compact, lightweight, and low-cost.**
- **The on-board 300 Series filter can be inserted in PC boards and is suitable for subminiature devices such as switching power sources.**
- **The 500 Series employs tab terminals which can be connected easily.**

### NOISE CHARACTERISTICS

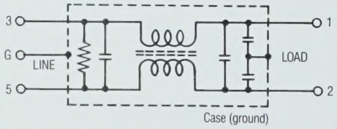
Noise carried on power supply lines is divided into symmetric waveforms (balanced) which propagate along the cable lines, and asymmetric waveforms (unbalanced) which propagate between the cable lines and the earth. In practice, however, most of the noise observed is a combination of these two types, with a large asymmetric wave noise such as the noise produced by a switching power source. These noise filters prove effective on both of the above mentioned kinds of noise. The 300 and 500 Series in particular are chiefly designed to eliminate noise due to such switching sources or to equipment in which such sources are mounted.

### RECOGNIZED STANDARDS

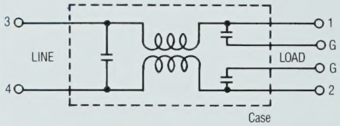
| | | |
|---|---|---|
| **UL 1283** | E85523 (Approval for PLF-300 type has been applied for.) | |
| **CSA C22.2 No. 8** | LR58157 (Approval for PLF-300 and -500 types has been applied for.) | |
| **TUV 0565-3** | PLF-SV | R75148 |
| | PLF-300 | R75146 |
| | PLF-500 | R75147 |

### CIRCUITS

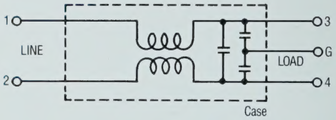
**I: Standard (1A to 30A)**



**II: 300 Series (2 to 3A)**



**III: 500 Series (2 to 5A)**



# NOISE FILTERS
# for AC LINE APPLICATIONS

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## PLF Series

## SPECIFICATIONS

| Part Number | Rated Current (A) | DC Resistance (Ω) | Frequency Range in which Attenuation of 30dB is Guaranteed: Line to Line (MHz) | Frequency Range in which Attenuation of 30dB is Guaranteed: Line to ground (MHz) | Rise in Temperature (°C) | Temperature Range (°C) | Circuit | Fig. | Safety Stds. |
|---|---|---|---|---|---|---|---|---|---|
| **PLF-SV (Lead wire)** | | | | | | | | | |
| PLF-SV-1RA | 1.0 | 0.3 max. | 0.3 to 30 | 0.4 to 30 | 30 max. | −20 to +60 | I | 1 | UL<br>CSA<br>TUV |
| PLF-SV-2RA | 2.0 | 0.2 max. | 0.4 to 30 | 0.5 to 30 | | | | | |
| PLF-SV-3RA | 3.0 | 0.1 max. | 0.3 to 30 | 0.4 to 30 | | | | 2 | |
| PLF-SV-5RA | 5.0 | 0.1 max. | 0.4 to 30 | 0.5 to 30 | | | | | |
| **PLF-SV (Threaded terminal)** | | | | | | | | | |
| PLF-SV-3RA-010 | 3 | 0.1 max. | 0.3 to 30 | 0.4 to 30 | 30 max. | −20 to +60 | I | 3 | UL<br>CSA<br>TUV |
| PLF-SV-5RA-010 | 5 | 0.1 max. | 0.4 to 30 | 0.5 to 30 | | | | | |
| PLF-SV-7RA-010 | 7 | 0.05 max. | 0.4 to 30 | 0.5 to 30 | | | | 4 | |
| PLF-SV-10A-010 | 10 | 0.05 max. | 0.5 to 30 | 0.6 to 30 | | | | | |
| PLF-SV-15A-010 | 15 | 0.05 max. | 0.4 to 30 | 0.5 to 30 | | | | 5 | |
| PLF-SV-20A-010 | 20 | 0.05 max. | 0.5 to 30 | 0.6 to 30 | | | | | |
| PLF-SV-30A-010 | 30 | 0.05 max. | 0.5 to 30 | 0.6 to 30 | | | | | |
| **PLF-300** | | | | | | | | | |
| PLF-2V-1RA-311 | 1 | 0.15 max. | 1 to 30 | 0.6 to 30 | 30 max. | −25 to +85 | II | 6 | UL*<br>CSA*<br>TUV* |
| PLF-2V-3RA-313 | 3 | 0.1 max. | 2 to 30 | 0.8 to 30 | | | | | |
| PLF-2V-5RA-315 | 5 | 0.05 max. | 3 to 30 | 2 to 30 | | | | | |
| **PLF-500** | | | | | | | | | |
| PLF-2V-1RA-511 | 1 | 0.15 max. | 1 to 30 | 0.6 to 30 | 30 max. | −25 to +85 | III | 7 | UL*<br>CSA*<br>TUV* |
| PLF-2V-3RA-513 | 3 | 0.1 max. | 2 to 30 | 0.8 to 30 | | | | | |
| PLF-2V-5RA-515 | 5 | 0.05 max. | 3 to 30 | 2 to 30 | | | | | |

*Pending

## DIMENSIONS: in. (mm)

Fig. 1

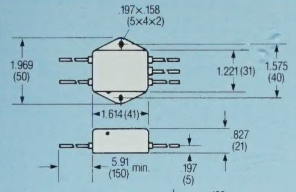


Fig. 2

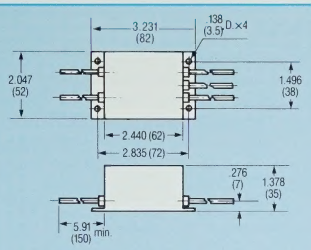


Fig. 3

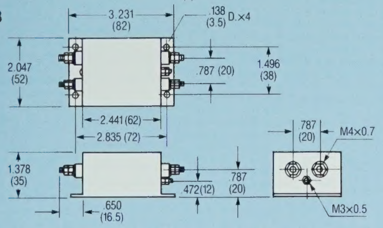


Fig. 4

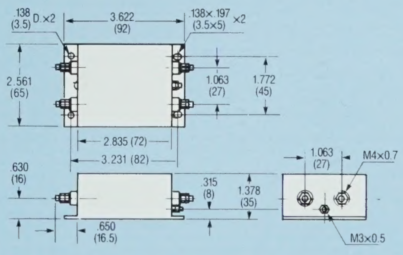


Fig. 5

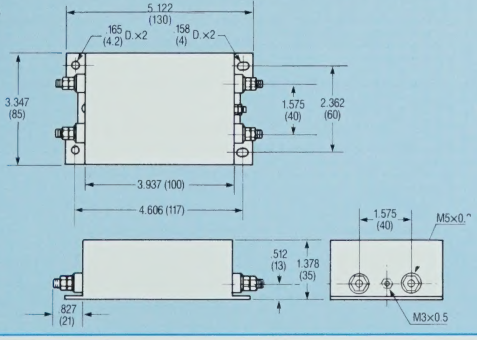


Fig. 6

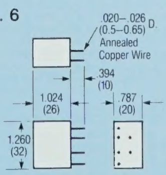
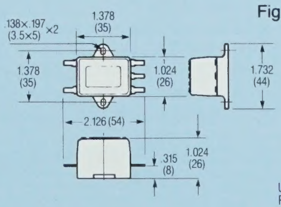
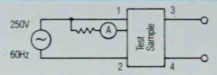
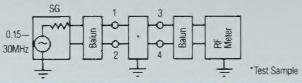


Fig. 7



UL
Registered
Type

## ELECTRICAL SPECIFICATIONS

| | | |
|---|---|---|
| Rated Voltage | | 250VAC |
| Rated Current | | Varies with models (1A—30A) |
| Operational Temperature Range | | −20°C—60°C |
| Withstand Voltage | Across Lines | No abnormality shall be found when 500VAC is applied between terminals 1 and 2 (or 3 and 4). |
| | To Ground | There shall be no abnormality when terminals 1 and 2 (or 3 and 4) are connected and 1500VAC (or 2000VAC depending on models) is applied between the contact point and the case or the ground terminal. |
| Insulation Resistance | Across Lines | 500MΩ or more when DC 500V is applied in the same manner as that in withstanding voltage.<br>Charging time shall be 2 minutes. |
| | To Ground | Same as above. |
| Leak Current |  | Current which flows in 1KΩ resistor shall be 0.5mA or less. |
| Attenuation | Attenuation = 20 $\log_{10} E_2/E_1$ (dB)<br>  SG<br>0.15—30MHz<br>Balun<br>Balun<br>RF Meter<br>1<br>2<br>3<br>4<br>*Test Sample | |
| Rise in Temperature | Temperature rise at the center of the case surface shall not exceed 30°C when a rated current at 60Hz is supplied at 25° ± 5°C before thermal equilibrium has been attained (by feeding current for more than 1 hour). | |

## ENVIRONMENTAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| Humidity Resistance | Withstand Voltage | Across Lines | No abnormality shall be noted when 500VAC is applied for 1 minute. | The following requirements shall be met, when measured, after leaving the test sample in an environment of 40°C and 90—95% RH for 250 hours. (MIL-STD-202D-103B) |
| | | To Ground | No abnormality shall be noted when 1500VAC is applied (or 2000VAC, depending on the model) for 1 minute. | |
| | Insulation Resistance | | 150MΩ Min. (both across lines and to ground) | |
| | Damping | | Shall satisfy the initial values set for individual standards. | |
| Vibration Resistance | | | Vibration at low frequency in the directions of X, Y and Z axes (MIL-STD-202D-201A) | |
| Temperature Cycle | | | −55°C→ +85°C, 5-cycle (MIL-STD-202D-102A) | |
| Service life in a humid environment | | | Rated current is fed for 1000 hours in an environment of 40°C and 90—95% RH. | |
| Service life at high temperatures | | | Rated current is fed for 1000 hours at 70°C. | |
| Durability at high temperatures | | | Sample is left for 1000 hours in 100°C. | |
| Durability at low temperatures | | | Sample is left for 1000 hours in −40°C. | |

## APPEARANCE

1. Check visually for scratches, stains or other detrimental defects.

## PRODUCT IDENTIFICATION

Product name, rated voltage and current, test voltage (to ground), manufacturing lot number and name of manufacturer shall be indicated.

## USING NOISE FILTERS

To use noise filters correctly, observe the following.

1. A noise filter of the type housed in a metal case should be mounted so that it will fit closely on the chassis, etc. (grounding member) to establish a metal-to-metal contact. To this end, any paint applied to the interface should be removed.
2. In the case of plastic case type, the ground wire should be made as short as possible.
3. Lead wires for the input and output sides of the noise filter should be arranged to be as short as possible along the chassis (ground) so that they do not cross each other (to separate input from output and reduce radiation).
4. It is effective to insert a noise filter in the power supply source with the circuit, vulnerable to spatial propagation noise (radiation), protected by a metal shield.
5. Filters of the PLF type are directional; in principle, therefore, they should be connected as instructed in the specifications or as specified in the catalogs.

## CONSIDERATIONS IN SELECTING A NOISE FILTER

The following should be considered in selecting a suitable noise filter.

1. Check if the rating is sufficient for the equipment on which the filter is to be used. Ensure safety, in particular, in regard to such considerations as rated current and voltage values, operational temperature and other environmental conditions.

**2. What is the intended purpose?**

a. To prevent misoperation of the equipment due to external noise

b. To prevent noise produced by the equipment

c. To prevent both of these

**3. Composition of noise to be prevented**

a. The frequency band of the noise to be prevented and the approximate damping value thereof should be determined beforehand. If it is difficult to quantify, as in the case of interference to AM radios, noise in the range of 0.5—2MHz must nevertheless be prevented or damped; therefore, a filter having a large damping characteristic in this band should be selected.

b. Common mode noise (of asymmetric waveform) should be prevented. (To prevent malfunction in microcomputers or other digital equipment as well as noise produced at switching power source, etc.)

c. Normal mode noise (of asymmetric waveform) should be prevented. (Production of noise in thyristor controller.)

d. Noises of both modes should be prevented. (This case, in which the mode of noise cannot be determined, is most common in practical applications.)

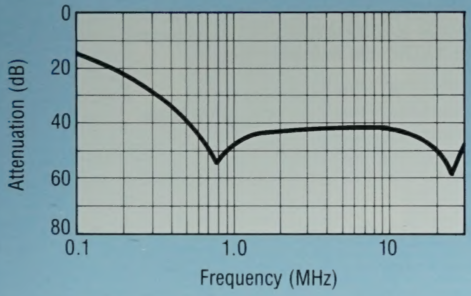
e. The noise-producing level is to be reduced to the value specified by a certain standard. (The level of the noise produced in the equipment is measured, to be taken as reference for selection.)

**4. Means of mounting noise filter to the equipment; dimensions**

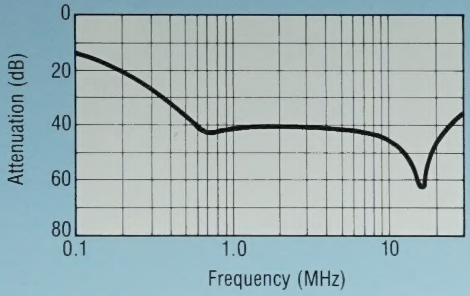
Noise filter construction differs depending on whether the filter is mounted on a metal chassis or a printed circuit board, and the space for mounting the noise filter must be considered.

## TYPICAL ATTENUATION CHARACTERISTICS

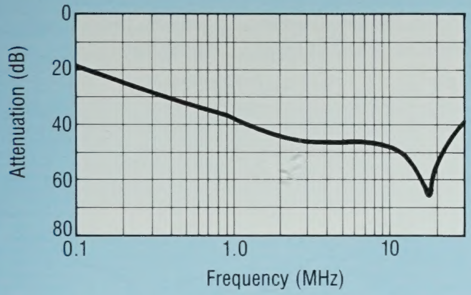
**PLF-SV-2RA**



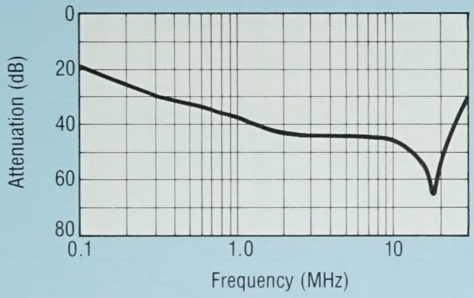
**PLF-SV-10A-010**



**PLF-2V-1RA-311**

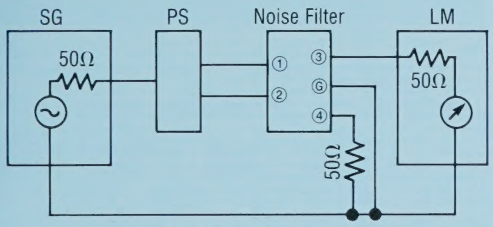


**PLF-2V-1RA-511**



### ■ ATTENUATION CHARACTERISTICS (Common mode)

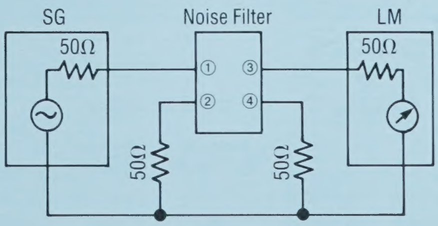
- Common mode (between grounds)



SG : Signal Generator
PS : Power Splitter
LM : Level Meter

### ■ ATTENUATION MEASURING CIRCUIT

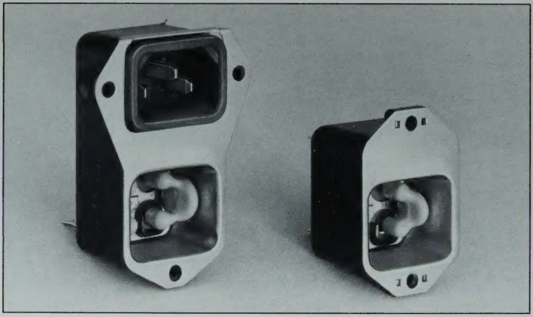
- Normal mode (between wires)



SG : Signal Generator
LM : Level Meter

# NOISE FILTERS
# FOR AC LINE APPLICATIONS

## PLI-C/PLF-C Series



### FEATURES

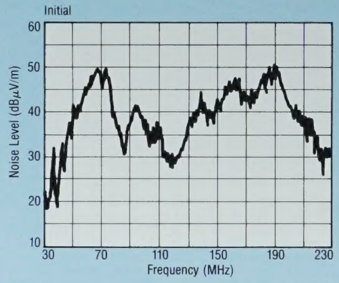
- **Built-in 3-terminal line by-pass capacitor—high-frequency noise over 30MHz is efficiently suppressed from AC power cords.**
- **Ground is made stable by mounting on back of chassis.**
- **Recognized by major safety organizations.**
- **Noise specifications such as those prescribed by FCC and VDE, can be easily met.**

### APPLICATIONS

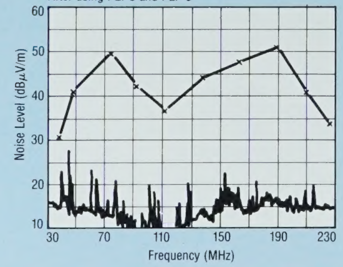
- **Personal computers and peripherals**
- **Digital equipment**
- **Measuring equipment**
- **Other types of industrial and consumer equipment**

### TYPICAL RESULTS

Initial



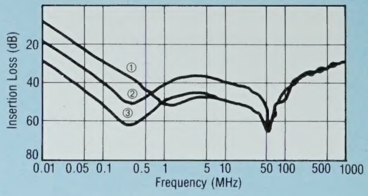
After using PLI-C and PLF-C



### SPECIFICATIONS

| | | |
|---|---|---|
| Rated Voltage | | 250VAC |
| Rated Current | | 6A |
| Withstand Voltage | Line to Ground | 1500VAC for one minute |
| | Line to Line | 500VAC for one minute |
| Insulation Resistance (Line to Ground) | | 500MΩmin. (DC500V) |
| Operating Temperature Range | | −25° to +85°C |
| Leakage Current (250V 60Hz) | | 0.5mA max. |

### TYPICAL I.L. CHARACTERISTICS



① to FCC: PLI-C + PLA (3mH)
② to CISPR: PLI-C + PLE (8mH)
③ to FTZ countermeasure PLI-C + PLC20 (30mH)

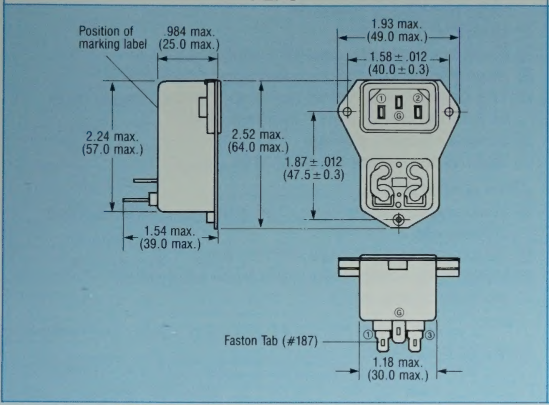
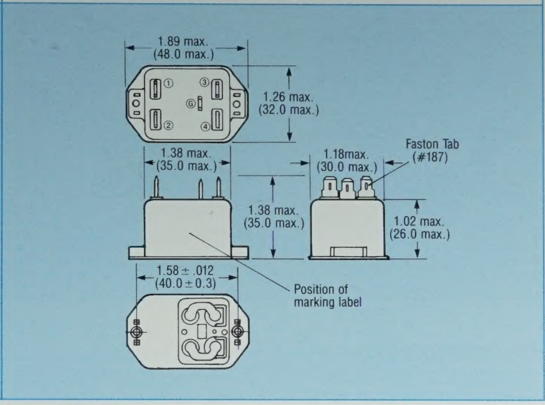
### PERFORMANCE

| Part Number | | Circuit Composition | | Leakage Current (mA max.) | Insertion Loss (dB) Line to ground (MHz) | | | | Recognized Safety Standards | | TUV565-3 (PLI-C: R60275 PLF-C: R60276) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Across-the line-Capacitor | Discharge Resistor | | 10 | 30 | 100 | 300 | UL1283 (E85523) | CSA C22.2 No. 8 (LR58157) | |
| PLI-C1020 | PLF-C1020 | inside | none | 0.4 | 14 | 30 | 30 | 20 | ○* | ○* | ○ |
| PLI-C1030 | PLF-C1030 | | | 0.5 | 17 | 36 | 30 | 20 | | | |
| PLI-C1040 | PLF-C1040 | | | 0.8 | 20 | 40 | 30 | 20 | | | |
| PLI-C2020 | PLF-C2020 | none | inside | 0.4 | 14 | 30 | 30 | 20 | | ○* | ○ |
| PLI-C2030 | PLF-C2030 | | | 0.5 | 17 | 36 | 30 | 20 | | | |
| PLI-C2040 | PLF-C2040 | | | 0.8 | 20 | 40 | 30 | 20 | | | |

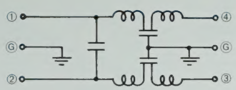
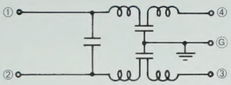
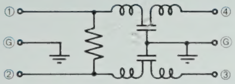
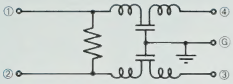
*Under application for PLF-C Series.

# PLI-C/PLF-C Series

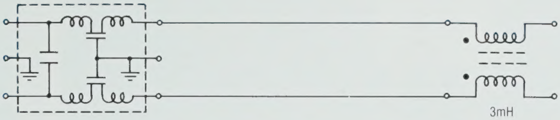
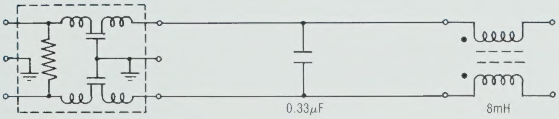
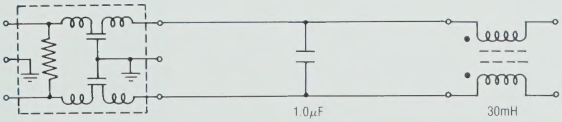
## DIMENSIONS: in (mm)

| PLI-C | PLF-C |
|---|---|
|  Position of marking label<br>.984 max. (25.0 max.)<br>1.93 max. (49.0 max.)<br>1.58 ± .012 (40.0 ± 0.3)<br>2.24 max. (57.0 max.)<br>2.52 max. (64.0 max.)<br>1.87 ± .012 (47.5 ± 0.3)<br>1.54 max. (39.0 max.)<br>① ② Ⓖ<br>Faston Tab (#187)<br>Ⓖ ① ③<br>1.18 max. (30.0 max.) |  1.89 max. (48.0 max.)<br>① ③ Ⓖ ② ④<br>1.26 max. (32.0 max.)<br>1.38 max. (35.0 max.)<br>1.18max. (30.0 max.)<br>Faston Tab (#187)<br>1.38 max. (35.0 max.)<br>1.02 max. (26.0 max.)<br>1.58 ± .012 (40.0 ± 0.3)<br>Position of marking label |

## CIRCUIT DIAGRAMS

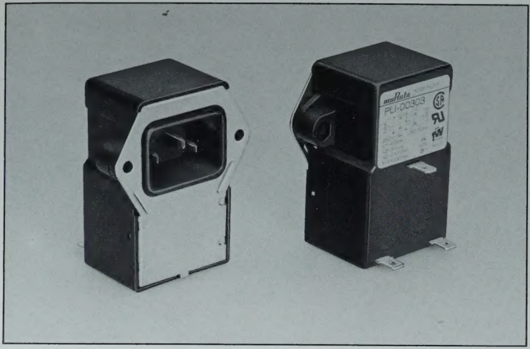
| | | |
|---|---|---|
| Across-the-line-Capacitor Built-in Type |  |  |
| Discharge Resistor Built-in Type |  |  |

## RECOMMENDED CIRCUIT COMBINATIONS

| Noise control | PLI-C/PLF-C | Across-the line-Capacitor | Common mode choke coil PLA,PLE,PLC Type* |
|---|---|---|---|
| FCC (VCCI)<br>(450KHz) |  | | |
| CISPR<br>(150KHz) |  | | |
| FTZ, VDE<br>(10KHz) |  | | |

*Murata Erie's common mode choke coils are available in PLA, PLE and PLC types with variations such as inductance-value and rated current value.

# PLI-D/PLI-E Series



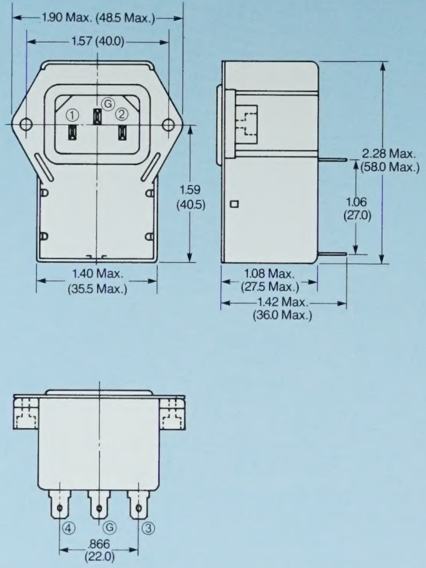
## FEATURES

- Excellent suppression of common mode noise over a wide frequency band.
- Meets UL1409/1410.
- Excellent lightning surge withstandability.
- Recognized by major safety organizations.
- The filter case is fitted to back of the chassis, thus providing stable noise suppression.
- Easy-to-mount design.
- Utilizes faston-terminal (#187).

## APPLICATIONS

- Personal computers and peripherals (printers, disk drives, etc.)
- Office equipment (Fax, PPC's, etc.)
- Measuring equipment (spectrum analyzers, oscilloscopes, etc.)

## DIMENSIONS: in (mm)



## SPECIFICATIONS

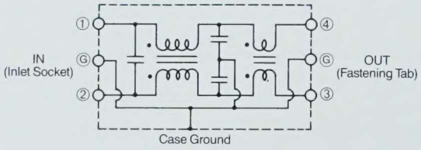
| Item | Specified Value |
|---|---|
| Rated Voltage | 250VAC |
| Withstand Voltage | 1500VAC (1 Minute in line to ground) |
| Insulation Resistance | 500MΩ min (500VDC 1 Minute value) |
| Leakage Current | 0.5mA Max. (250V, 60Hz) |
| Operating Temperature Range | −25°C to +60°C |

## RECOGNIZED SAFETY STANDARDS

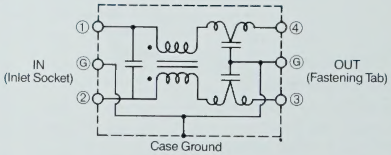
| | |
|---|---|
| UL 1283 | E85523 |
| CSA C22.2 NO. 8 | LR58157 |
| TUV 0565-3 | R75149 |

## CIRCUIT DIAGRAMS

### PLI-D



### PLI-E

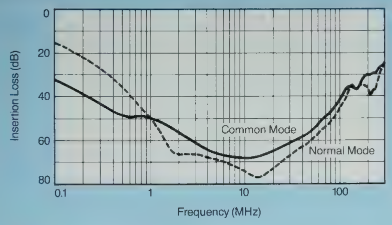


## PERFORMANCE

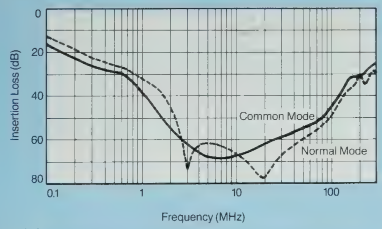
| Part Number | Rated Current (A) | DC Resistance Max. (Ω) | Temperature Rise (°C) | Attenuation Range (MHz) | |
|---|---|---|---|---|---|
| | | | | Between lines (30dB) | Line to ground (40dB) |
| **PLI-D0101** | 1 | 0.5 Max. | 30 Max. (Case Surface) | 0.5 to 200 | 0.3 to 90 |
| **PLI-D0202** | 2 | 0.3 Max. | | 0.8 to 200 | 0.8 to 100 |
| **PLI-D0303** | 3 | 0.1 Max. | | 1.0 to 200 | 1.5 to 100 |
| **PLI-D0405** | 5 | 0.05 Max. | | 1.5 to 250 | 2.0 to 200 |
| **PLI-E0101** | 1 | 0.5 Max. | 30 Max. (Case Surface) | 0.5 to 200 | 0.3 to 60 |
| **PLI-E0202** | 2 | 0.3 Max. | | 0.7 to 200 | 0.6 to 60 |
| **PLI-E0303** | 3 | 0.1 Max. | | 1.0 to 200 | 1.5 to 70 |
| **PLI-E0406** | 6 | 0.05 Max. | | 1.5 to 250 | 3.0 to 80 |

## INSERTION LOSS CHARACTERISTICS

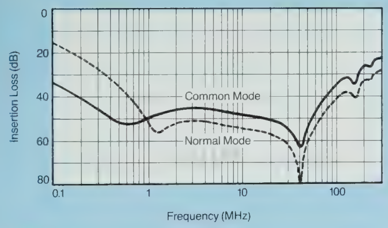
**PLI-D0101**



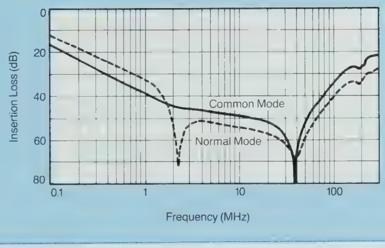
**PLI-D0303**



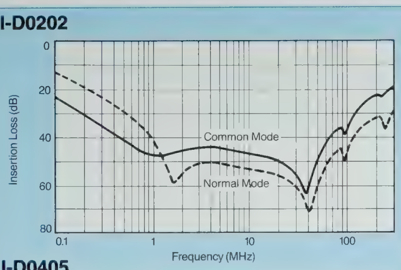
**PLI-E0101**



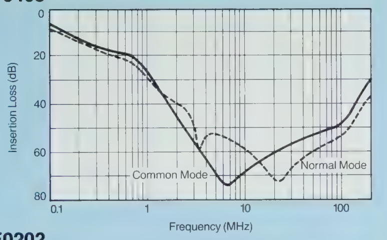
**PLI-E0303**



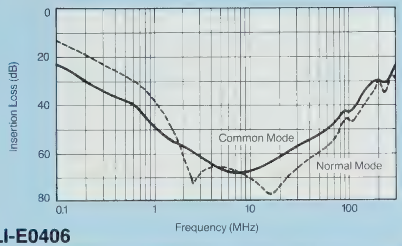
**PLI-D0202**



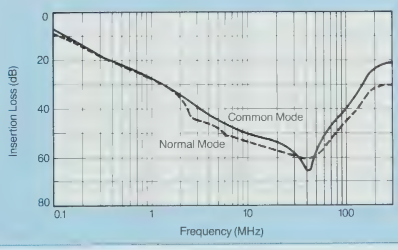
**PLI-D0405**



**PLI-E0202**

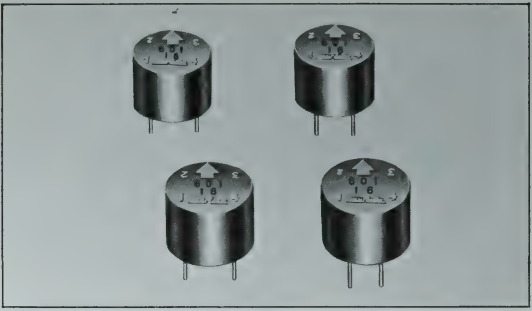


**PLI-E0406**



# NOISE FILTERS
# COMMON MODE CHOKE COIL

## FKOB Series



The FKOB Series is a common mode choke coil, effective for asymmetric wave (unbalanced noise), used chiefly for preventing noise in color TV or VTR.

The filter is discretely mounted on the power source PC board together with a capacitor to serve as a noise prevention circuit. Filters of this type are also used in quantities for noise prevention in small electronic devices and power sources where use of a full-scale noise filter is impractical due to the limited space in such compact devices. Though the noise prevention of this kind of filter differs with the capacitor in parallel, it permits incorporation of a filter circuit consisting of at least one coil and capacitor on the board.

### FEATURES

- **Meets FCC noise requirements**
- **Compact design achieved by the use of highly permeable ferrite material.**
- **Excellent frequency characteristics, useable from 100 KHz to several tens of MHz.**
- **Less temperature and less effect on the environment with equipment temperature held to 30°C or less.**
- **Negligible reduction to inductance due to load current.**
- **The filter's construction and the insulation material used satisfy the requirements of applicable safety standards (i.e., UL standard).**

### APPLICATIONS

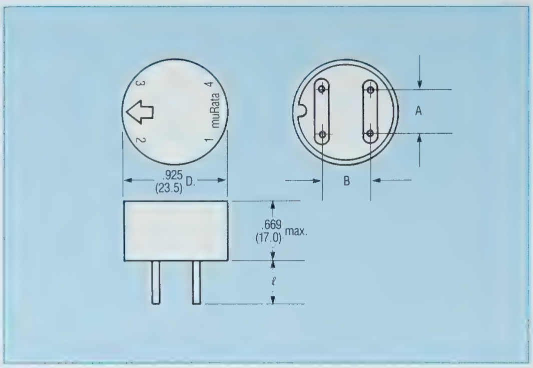
**For prevention of Internally generated noise**

Switching sources, Thyristor control devices, Contact noise and Ultrasonic wave devices.

**For prevention of external noise**

Microcomputer (digital equipment), CTV, VTR, ECR. Electronic scales. POS.

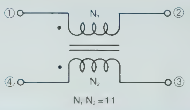
### DIMENSIONS: in (mm)



### CONSTRUCTION

Non-flammable materials as per UL 94V-O are used for insulation, and a distance of more than 3.2 mm is provided for insulation between opposite poles.

### CIRCUIT DIAGRAM



### SPECIFICATIONS

**Dimensions: in (mm)**

| Part Number | Inductance ($\mu$H) | RDC (mV) | Rated Volt. (VAC) | Rated Current (Arms) | Freq. at Self Resonance (MHz) | Lead Pitch A/B | Lead Length ℓ |
|---|---|---|---|---|---|---|---|
| FKOB160MH02* | ≥ 250 | < 50 | (250) | 2.5 | 5 | .315(8) /.394(10) | .394(10) |
| FKOB160MH06 | ≥ 250 | < 50 | (250) | 2.5 | 5 | .512(13)/.394(10) | .177(4.5) |
| FKOB160MH25* | ≥ 600 | < 80 | (250) | 2.5 | 4 | .315(8) /.394(10) | .394(10) |
| FKOB160MH13* | ≥ 600 | < 80 | (250) | 2.5 | 4 | .512(13)/.394(10) | .177(4.5) |
| FKOB160MH23* | ≥ 800 | < 80 | (250) | 2.5 | 4 | .315(8) /.394(10) | .394(10) |
| FKOB160MH14 | ≥ 800 | < 80 | (250) | 2.5 | 4 | .512(13)/.394(10) | .177(4.5) |
| FKOB160MH26* | ≥1000 | <100 | (250) | 1.5 | 2.5 | .315(8) /.394(10) | .394(10) |
| FKOB160MH16 | ≥1000 | <100 | (250) | 1.5 | 2.5 | .512(13)/.394(10) | .177(4.5) |
| FKOB160MH24* | ≥1500 | <120 | (250) | 1.5 | 1.5 | .315(8) /.394(10) | .394(10) |
| FKOB160MH15* | ≥1500 | <120 | (250) | 1.5 | 1.5 | .512(13)/.394(10) | .177(4.5) |

*Standard units

# NOISE FILTERS
# COMMON MODE CHOKE COIL

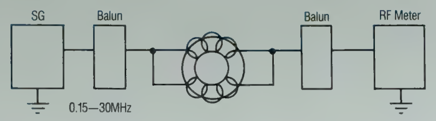
muRata ERIE

## FKOB Series

### ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Inductance | Values measured with a 1KHz universal bridge in the range between 250—1500MHz are divided into 5 steps and each of the minimum values in the respective steps is taken as the standard inductance value. |
| Rated Current | Rated currents are set within the range in which the temperature rise is 30°C or lower and are rated at 1.5A and 2.5A. |
| DC Resistance | Specified at 50—120mΩ depending on the difference in impedance. |
| Operational Temperature Range | −20°C— +60°C |
| Temperature Characteristic | Specified, on the basis of the variation in inductance, as being 20°C (the reference value $^{+80}_{-20}$%.) |
| Insulation Resistance | Insulation resistance, measured with 500VDC between both coils and between the coil and the casing, shall be more than 100MΩ. |
| Withstand Voltage | There shall be no abnormality when 2KVAC is applied between both coils. |

### TEST CIRCUIT

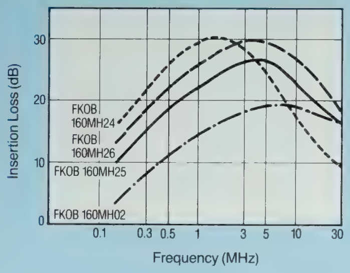


### ENVIRONMENTAL TESTS

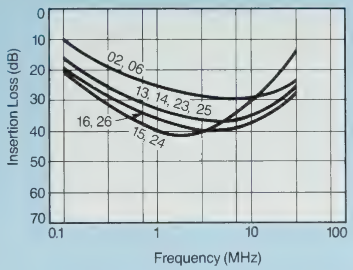
| | |
|---|---|
| Heat Cycle | There shall be no abnormality when tested in 10 cycles, one cycle consisting of holding for 20 minutes at 80°C and for 20 minutes at −20°C. |
| Humidity Resistance | There shall be no abnormality when measured after 1000 hours in a constant temperature and humidity environment of 40±2°C and 90—95% RH respectively. |
| Solder Dip Test | There shall be no abnormality in appearance when the lead wire is dipped in solder of 350±10°C for 5±1 seconds. |

### ATTENUATION CHARACTERISTICS

**FKOB160MH**

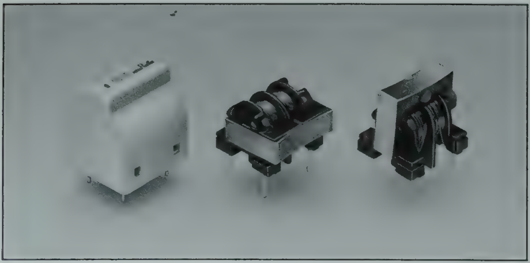


**FKOB160MH**



# NOISE FILTERS
# COMMON MODE CHOKE COIL

## PLA Series



The PLA Series is a common mode choke coil effective for asymmetric waves (unbalanced noise). This circuit is applicable to color TV's, VTR's, switching power supplies, power supply circuit boards and others. It is particularly effective for preventing even the slightest amount of noise in compact electronic equipment.

### APPLICATIONS

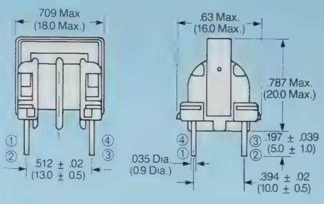
Switching power supplies, color TV's, VTR's, ECR, and other electronic equipment.

### FEATURES

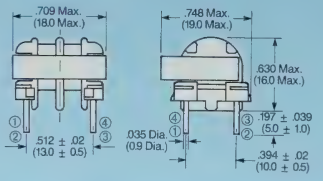
- **Compact, lightweight construction incorporating a highly permeable ferrite core.**
- **Operates effectively in a frequency range of 0.1 to 15 or 16MHz. Compared to toroidal cores, it attenuates a very wide range of low frequencies from 0.1 to 5 or 6MHz.**
- **Negligibly small reduction in inductance due to load current.**
- **Flame-retardant materials and very simple construction assure safety and dependability.**
- **Suitable for noise reduction per FCC and CISPR requirements.**

### DIMENSIONS: in.(mm)

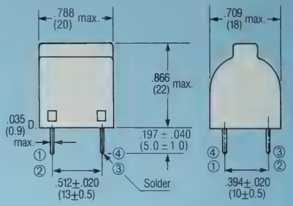
**Uncased Type A**



**Uncased Type B**



**Case Type C**

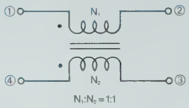


### SPECIFICATIONS

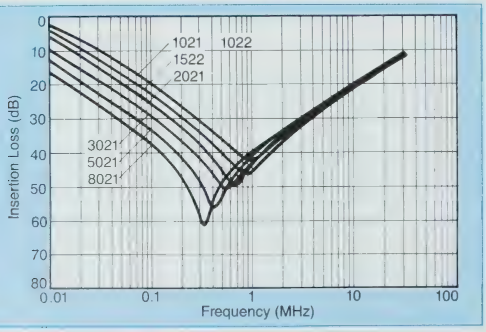
| Type* | Inductance (mH) min. | Rated Current (Arms) | DC Resistance (Ω) max. | Self-resonant Frequency** (MHz) |
|---|---|---|---|---|
| PLA1021☐ | 1.0 | 1 | 0.25 | 1.0 |
| PLA2021☐ | 2.0 | 1 | 0.30 | 0.7 |
| PLA3021☐ | 3.0 | 1 | 0.35 | 0.5 |
| PLA1022☐ | 1.0 | 2 | 0.15 | 1.0 |
| PLA1522☐ | 1.5 | 2 | 0.20 | 0.9 |
| PLA5021☐ | 5.0 | 0.6 | 0.7 | 0.4 |
| PLA8021☐ | 8.0 | 0.5 | 1.0 | 0.3 |

*Suffix ☐ indicates configuration: A, B or C. See drawings.
**Self-resonant frequency is Typical Value.

### CIRCUIT DIAGRAM



### INSERTION LOSS CHARACTERISTICS



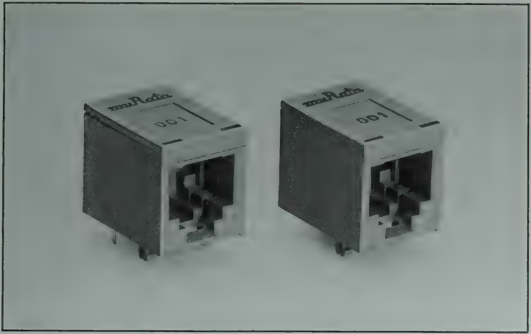
### ELECTRICAL SPECIFICATIONS

| Item | Ratings |
|---|---|
| **Rated Voltage** | 250VAC |
| **Dielectric Strength (between coils)** | 2000VAC, 1 minute |
| **Insulation Resistance** | 100MΩ min. |
| **Operating Temperature Range** | −25°C to +60°C |
| **Temperature Characteristics (Inductance)** | 20°C $^{+80}_{-50}$%(−25°C to +60°C) |
| **Special Test** | No abnormality against heat cycle, humidity, low temperature and high temperature. |
| **Mechanical Strength** | Stand the static load of pin strength 1kg. |

# NOISE FILTER
# COMMON MODE CONNECTOR FOR TELEPHONE APPLICATIONS

muRata ERIE

## CUJ Series



## FEATURES

- Ideal for suppression of common mode noise at high frequencies.
- Effective even with poor ground.
- Decreases PCB space requirements.
- UL recognized (UL94V-0) case material.

## APPLICATIONS

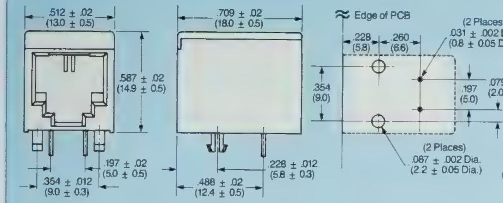
- Multi-function telephones.
- Security telephones.
- Modems.
- Fax systems.

## SPECIFICATIONS

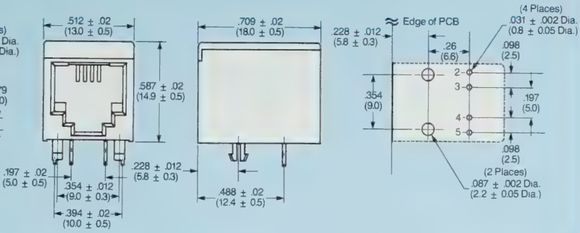
| | CUJ62H02F001 | CUJ64H04F001 |
|---|---|---|
| Number of Lines | 2 (Opening is for 6 line capability) | 4 (Opening is for 6 line capability) |
| Operating Temp. | −25°C to +60°C | |
| Rated Voltage (Between Lines) | 150VDC | |
| Rated Current | 1ADC | |
| Tested Voltage (Between Lines) | 375VDC | |
| Insulation Resistance (Between Lines) | 10MΩ | |
| Impedance (Pin 3 & 4) | — | 40Ω (at 100 MHz) |

## DIMENSIONS in: (mm)

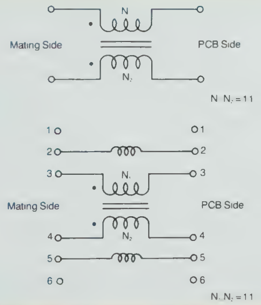
**CUJ62H02F001**



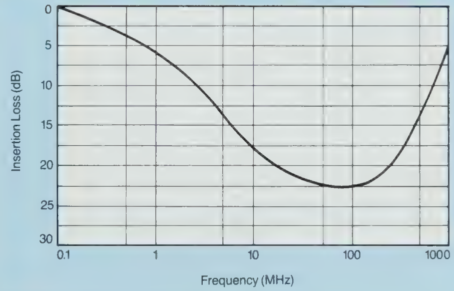
**CUJ64H04F001**



## CIRCUIT DIAGRAMS

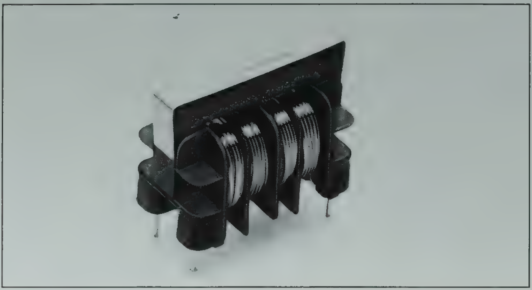


## INSERTION LOSS CHARACTERISTICS



# NOISE FILTERS
# COMMON MODE CHOKE COIL

## PLC/PLE Series



### FEATURES

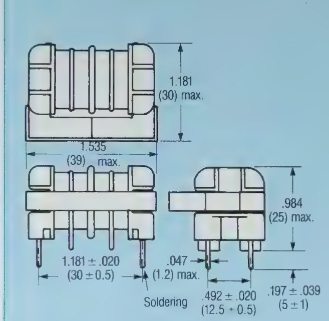
- **Meets FCC, CISPR, VDE noise regulations.**
- **Compact yet with large inductance. Allows common noise suppression from 10KHz.**
- **Effective for noise suppression in wide bands.**
- **Horizontally installed ferrite cores reduce height and are extremely suitable for equipment where height is limited.**

### APPLICATIONS

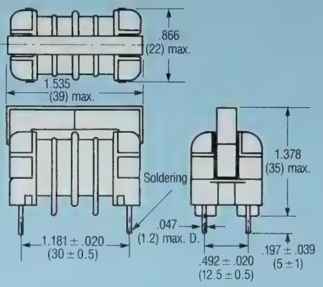
Switching power supplies, equipment incorporating microcomputers, digital equipment, CTV, VTR, ECR and other electronic equipment and appliances.

### DIMENSIONS: in. (mm)

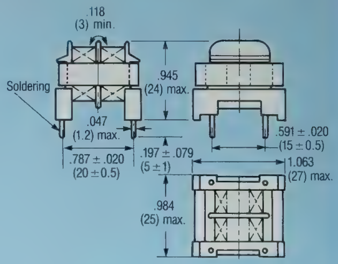
PLC20HD



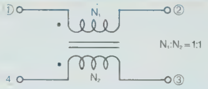
PLC20LD



PLE25H



### CIRCUIT DIAGRAM



### SPECIFICATIONS—PLC Series

| Part Number | Inductance (mH) min. | Rated Current (Arms) | DC Resistance (Ω) max. | Self-Resonant Frequency (MHz)* |
|---|---|---|---|---|
| PLC20HD-7030R5 | 70 | 0.5 | 3.0 | 0.1 |
| PLC20HD-3031R | 30 | 1.0 | 1.0 | 0.2 |
| PLC20HD-1131R5 | 11 | 1.5 | 0.4 | 0.3 |
| PLC20HD-6522R | 6.5 | 2.0 | 0.2 | 0.4 |
| PLC20HD-3023R | 3 | 3.0 | 0.1 | 0.7 |
| PLC20LD-7030R5 | 70 | 0.5 | 3.0 | 0.1 |
| PLC20LD-3031R | 30 | 1.0 | 1.0 | 0.2 |
| PLC20LD-1131R5 | 11 | 1.5 | 0.4 | 0.3 |
| PLC20LD-6522R | 6.5 | 2.0 | 0.2 | 0.4 |
| PLC20LD-3023R | 3 | 3.0 | 0.1 | 0.7 |

### ELECTRICAL RATINGS

| Item | Rating |
|---|---|
| Rated Voltage | 250VAC |
| Withstand Volt. (between coils) | One minute at 2000VAC |
| Insulation Resistance (between coils : 500VDC) | 100MΩ min. |
| Operating Temp. Range | −25°C to +60°C |
| Temp. Char. (Inductance) | 20°C $^{+80}_{-50}$% at the above temp. |

### SPECIFICATIONS—PLE Series

| Part Number | Inductance (mH) min. | Rated Current (Arms) | DC Resistance (Ω) max. | Self-Resonant Frequency (MHz)* |
|---|---|---|---|---|
| PLE25H-3030R5 | 30 | 0.5 | 1.2 | 0.1 |
| PLE25H-2230R7 | 22 | 0.7 | 1.0 | 0.1 |
| PLE25H-1531R | 15 | 1.0 | 0.7 | 0.1 |
| PLE25H-1131R3 | 11 | 1.3 | 0.6 | 0.15 |
| PLE25H-8021R5 | 8 | 1.5 | 0.4 | 0.2 |
| PLE25H-3022R | 3 | 2.0 | 0.2 | 0.25 |
| PLE25H-2023R | 2 | 3.0 | 0.1 | 0.4 |

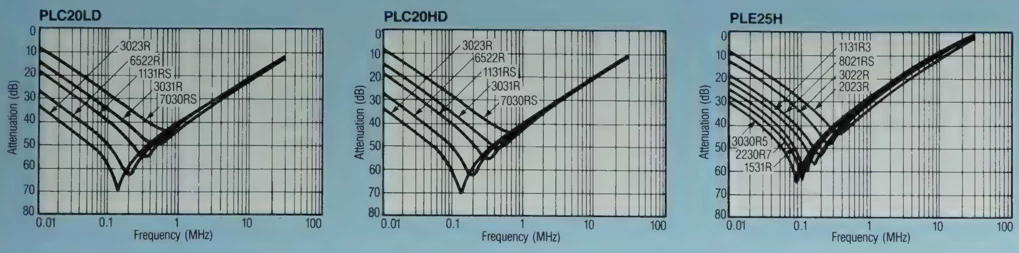
*The self-resonant value is the typical value.

# NOISE FILTERS
# COMMON MODE CHOKE COIL

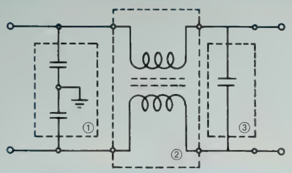
muRata ERIE

## PLC/PLE Series

## ATTENUATION CHARACTERISTICS



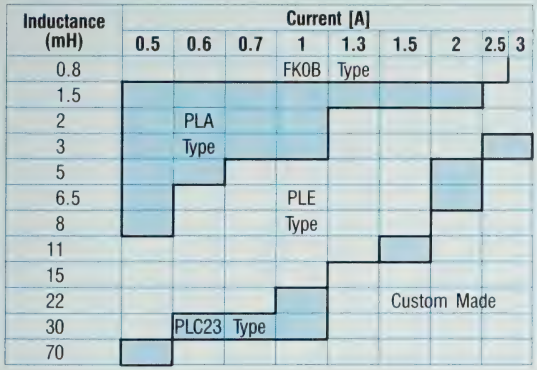
## HOW TO USE COMMON MODE CHOKE COIL



| No. | Name | Purpose |
|---|---|---|
| ① | Line bypass capacitor | Elimination of common mode noise and normal mode noise |
| ② | Common mode choke coil | Elimination of common mode noise |
| ③ | Across-the-line capacitor | Elimination of normal mode noise |

## SELECTION METHOD

Selection by rated current and inductance



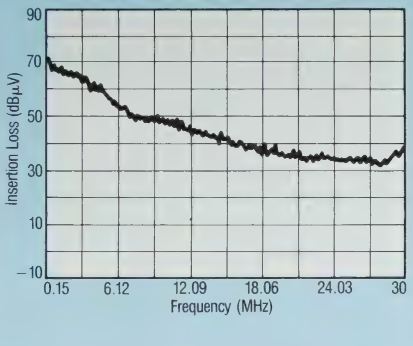
| Inductance (mH) | Current [A] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 1 | 1.3 | 1.5 | 2 | 2.5 | 3 |
| 0.8 | | | | FKOB | Type | | | | |
| 1.5 | | | | | | | | | |
| 2 | | PLA | | | | | | | |
| 3 | | Type | | | | | | | |
| 5 | | | | | | | | | |
| 6.5 | | | | PLE | | | | | |
| 8 | | | | Type | | | | | |
| 11 | | | | | | | | | |
| 15 | | | | | | | | | |
| 22 | | | | | | Custom | Made | | |
| 30 | | PLC23 | Type | | | | | | |
| 70 | | | | | | | | | |

Selection by noise regulations

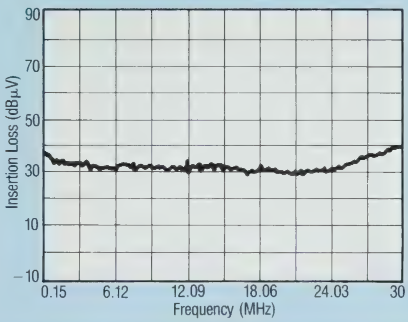
| Series name | Regulation | | |
|---|---|---|---|
| | FCC | CISPR | VDE |
| PLA | ○ | ○ | |
| FKOB | ○ | | |
| PLE | ○ | ○ | ○ |
| PLC | ○ | ○ | ○ |

## EFFECT OF MOUNTING OF COMMON MODE CHOKE

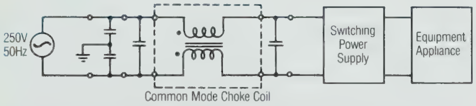
Noise level when not using common mode choke coil



Noise level when using common mode choke coil

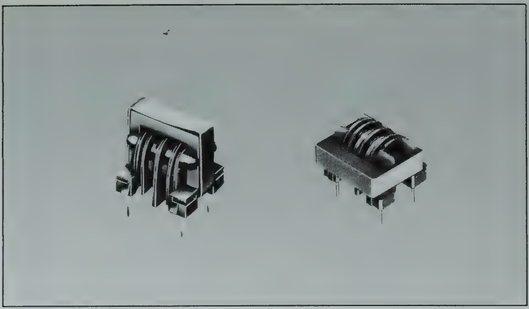


## OPERATING CIRCUIT



# NOISE FILTERS
# COMMON MODE CHOKE COIL

## PLC11 Series



### FEATURES

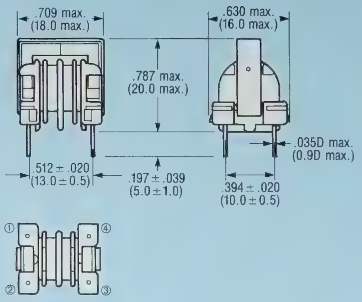
- Suppresses common mode noise in the AM band (525 to 1605KHz) and the FM band (76 to 108 MHz).
- Easily mounted
- Compact and light weight
- Very little inductance drop with increased load current

### APPLICATIONS

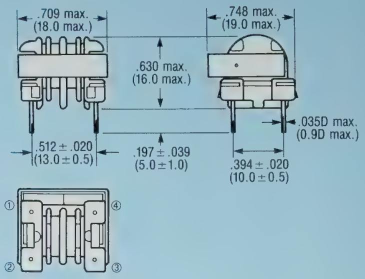
- Prevention of mixing of broadcast signals in circuits for multi-functional telephones, PBX and FAX.
- Suppression of EMI interference from AM and FM signals.

### DIMENSIONS: in. (mm)

**PLC11LS-1520R3**



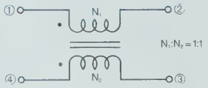
**PLC11HS-1520R3**



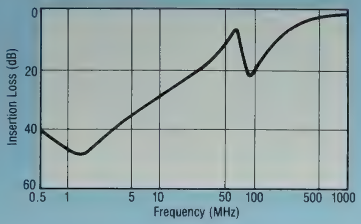
### SPECIFICATIONS

| | | |
|---|---|---|
| Rated Voltage | | 150VDC |
| Withstand Voltage | | 375VDC |
| Rated Current | | 300mA |
| Insulation Resistance | | 100MΩ min. |
| DC Resistance | | 0.5Ω max. |
| Inductance | | 1.5mH min. |
| Self-resonant Frequency*<br>*Typical value | first | 1.5MHz |
| | second | 95MHz |
| Operating Temperature Range | | −25°C to +60°C |

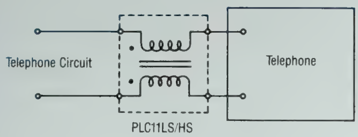
### CIRCUIT DIAGRAM



## TYPICAL INSERTION LOSS CHARACTERISTICS

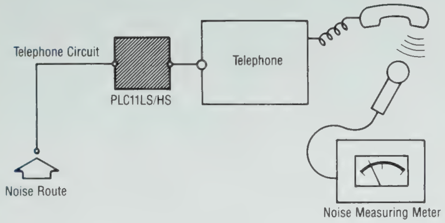


## APPLICATIONS

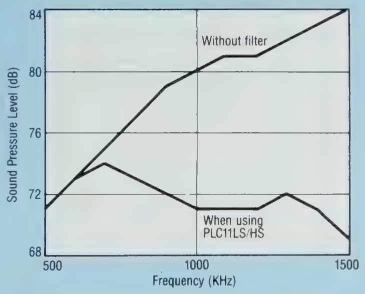


## EVALUATION METHOD

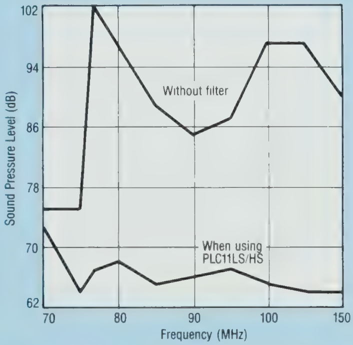
The broadcast band noise is applied to the telephone circuit and the sound pressure level is then measured for noise at the hand-set.



## AM BROADCAST BAND

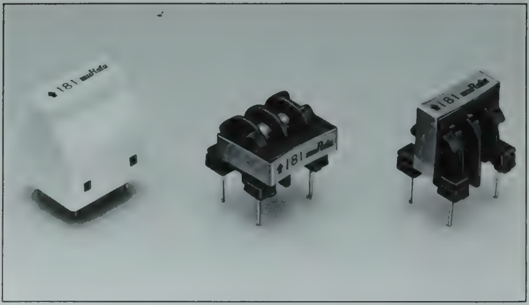


## FM TV L-ch BROADCAST BAND



# NOISE FILTERS
# COMMON MODE CHOKE COIL HIGH FREQUENCY

# PLH11 Series

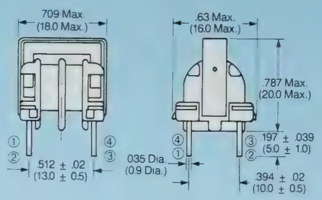


## FEATURES

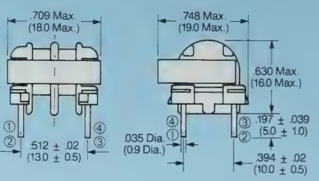
- 250 VAC Rated
- 2,400 VAC Withstand Voltage
- Up To 3.3 Arms
- UL94V-O Bobbin

## DIMENSIONS: in. (mm)

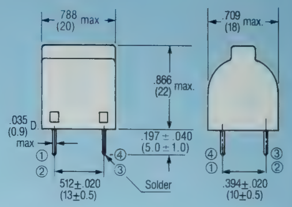
**PLH11L**



**PLH11H**



**PLH11C**



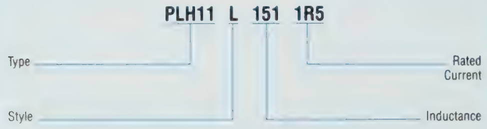
## SPECIFICATIONS

| Part Number | Inductance ($\mu$H) min. | Rated Current (Arms) | DC Resistance ($\Omega$) max. |
|---|---|---|---|
| PLH11L-1811R2 | 180 | 1.2 | 0.15 |
| PLH11H-1811R2 | | | |
| PLH11C-1811R2 | | | |
| PLH11L-1511R5 | 150 | 1.5 | 0.10 |
| PLH11H-1511R5 | | | |
| PLH11C-1511R5 | | | |
| PLH11L-8002R2 | 80 | 2.2 | 0.07 |
| PLH11H-8002R2 | | | |
| PLH11C-8002R2 | | | |
| PLH11L-6003R3 | 60 | 3.3 | 0.05 |
| PLH11H-6003R3 | | | |
| PLH11C-6003R3 | | | |

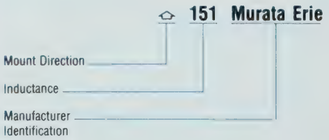
## RATINGS

| Item | Specifications |
|---|---|
| Rated Voltage | 250 V AC |
| Withstand Voltage | 2000 V AC (1 minute) or<br>2400 V AC (1 second) |
| Insulation Resistance | 100 MΩmin. (500VDC 1 minute) |
| Temperature Characteristics (Inductance) | 20°C $^{+80}_{-50}$%( −25°C to +60°C) |
| Operating Temperature Range | −25°C to +60°C |
| Bobbin | UL94V-0, F.L. E41429 or 46770 |

## PART NUMBERING



## MARKING



# NOISE FILTERS
# COMMON MODE CHOKE COIL

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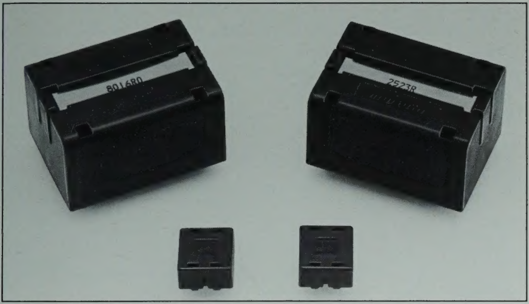
## PLH/PLT Series



### FEATURES

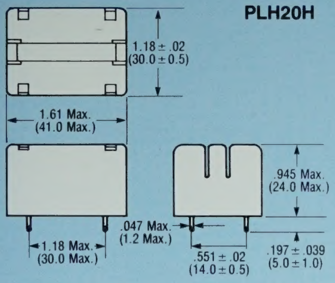
- Extended Self-Resonant Frequency
- Meets FCC, CISPR, VCCI Noise Requirements
- High Current Capacity - 6A Max.
- High Density Mounting

### APPLICATIONS

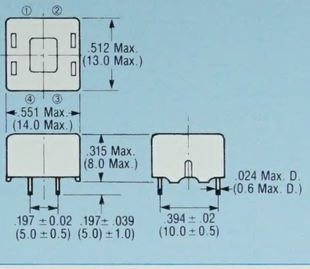
Switching Power Supplies
(Digital Equipment) CTV, VCR, ECR and Other Electronic Equipment and Appliances

### DIMENSIONS: in. (mm)

**PLH20H**



**PLT09H**



### SPECIFICATIONS

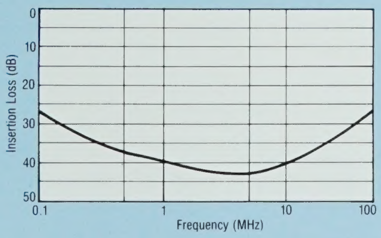
| Part Number | Inductance (mH) min. | Rated Current (Amps) | DC Resistance (Ω) max. |
|---|---|---|---|
| **PLH20H-9021R0** | 9.0 | 1.0 | 1.0 |
| **PLH20H-4622R0** | 4.6 | 2.0 | 0.3 |
| **PLH20H-2523R0** | 2.5 | 3.0 | 0.1 |
| **PLH20H-8016R0** | 0.8 | 6.0 | 0.1 |
| **PLT09H-2003R** | 20μH | 3.0 | 0.03 |

### RATINGS

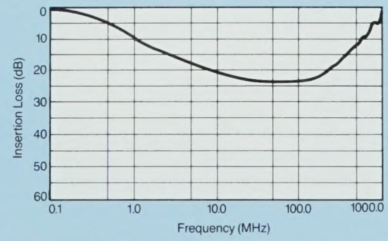
| | PLH20 | PLT09H |
|---|---|---|
| **Rated Voltage** | 250VAC | 50VDC |
| **Withstand Volt. (between coils)** | One minute at 2000VAC | 125VDC |
| **Insulation Resistance (between coils: 500 VDC)** | 100MΩ min. | 10MΩ min. |
| **Operating Temp. Range** | −25°C to +60°C | −25°C to +60°C |
| **Temp. Char. (Inductance)** | $20^{\circ}\mathrm{C}\,^{+80}_{-50}\%$ (−25°C to +60°C) | |

### INSERTION LOSS CHARACTERISTICS

**PLH20H-2523RO**

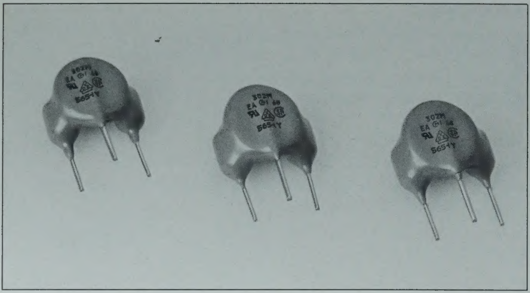


**PLT09H-2003R**



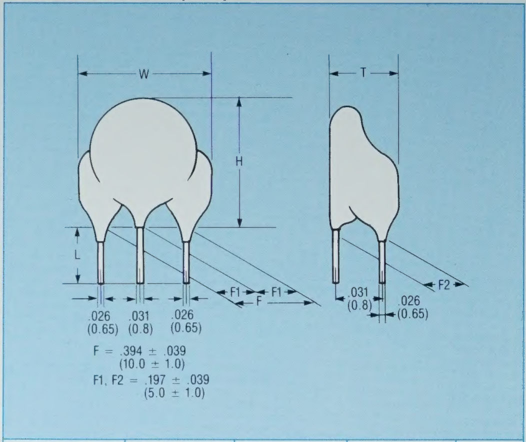
# EMI SUPPRESSOR FILTERS
# SAFETY STANDARD RECOGNIZED EMIFIL®
# for AC POWER SUPPLIES

## DSR Series



The EA type is a 3-terminal capacitor (EMIFIL®) for AC power supplies. Its combination of 3-terminal structure and ferrite beads results in better attenuation (over 20dB in the radio frequency band) compared to conventional 2-terminal capacitors. They are also UL, CSA, VDE, SEMKO and BSI recognized.

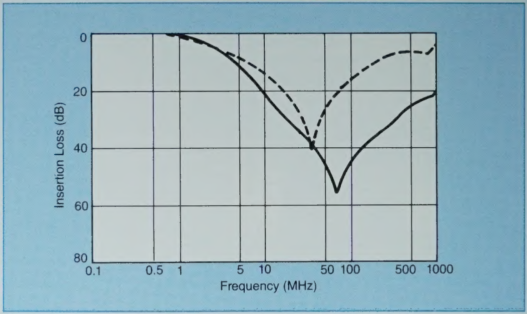
### DIMENSIONS: in. (mm)



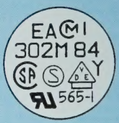
| Part Number | W | H | T | L |
|---|---|---|---|---|
| DSR1100 | .63 max.<br>(16.0 max.) | .591 max.<br>(15.0 max.) | .433 max.<br>(11.0 max.) | .236<br>(6.0) |
| DSR1120 | .63 max.<br>(16.0 max.) | .669 max.<br>(17.0 max.) | .433 max.<br>(11.0 max.) | |
| DSR1150 | .709 max.<br>(18.0 max.) | .866 max.<br>(22.0 max.) | .433 max.<br>(11.0 max.) | |

### INSERTION LOSS CHARACTERISTICS

Capacitance: 3000pF. The dotted line shows conventional capacitor.



### MARKING

| Item | | Marking |
|---|---|---|
| VDE Approved Mark | △ |  |
| UL Recognized Mark | ЯU | |
| CSA Monogram | SP | |
| SEMKO Approved Mark | Ⓢ | |
| Type Designation | EA | |
| Nominal Capacitance | | |
| Capacitance Tolerance | | |
| Manufacturer's Name | M | |

| Standard Number | Recognition Number |
|---|---|
| VDE565-1 | 41804 |
| UL 1414 | E37921 |
| CSA C22.2 No. 1 | LR58157 |
| SEMKO 101<br>55443 0414<br>89415 | 8736197<br>8736198<br>6862 |

### RATINGS

| Item | Ratings |
|---|---|
| Rated Current | 7 A (AC) |
| Insulation Resistance | 10000 MΩ Max. |
| Operating Temperature Range | −25°C to +85°C |

| Part Number | Temp. Char. | Cap. Value (pF) | Cap. Tol. (%) | Recognized Standards | | | | | Rated Voltage* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | UL 1414 | CSA C22.2 No. 1 | SEMKO | BS 415 | VDE 565-1 | |
| DSR1100-56 E222MVA2-EA | E | 2200 | ±20 | ● | ● | ● | ● | ● | VA2 |
| DSR1120-56 E302MVA2-EA | E | 3000 | ±20 | ● | ● | ● | ● | ● | VA2 |
| DSR1150-56 E472MVA2-EA | E | 4700 | ±20 | ● | ● | ● | ● | ● | VA2 |
| DSR1100-56 FZ472P VA2-EA | FZ | 4700 | +100, −0 | ● | ● | ● | ● | — | VA2 |

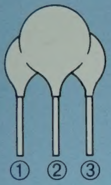
*VA2 : for VDE565-1, SEMKO, BST ···250VAC
for UL1414, CSA C22.2 No. 1···AC125V

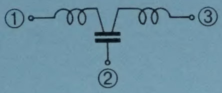
# EMI SUPPRESSION FILTERS
# SAFETY STANDARD RECOGNIZED EMIFIL® for AC POWER SUPPLIES

muRata ERIE

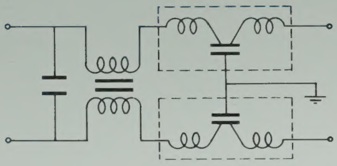
DSR Series

## EQUIVALENT CIRCUIT



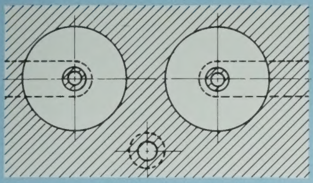


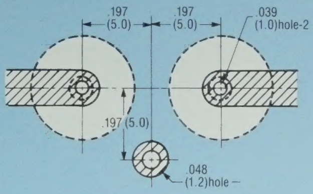
## TYPICAL APPLICATION



EA type can be used as line-by-pass (Y) capacitor

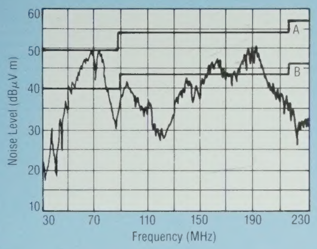
## RECOMMENDED P.C. BOARD PATTERNS



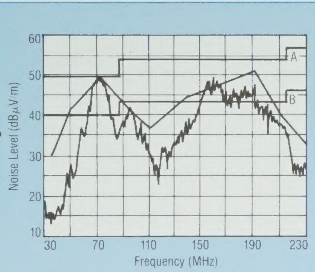


Make ground connection as wide as possible but with a distance as close as possible to the chassis ground.

## MOUNTING EFFECT (Procedure for suppression of radiated noise from power supply cord.)

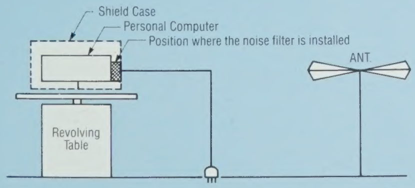


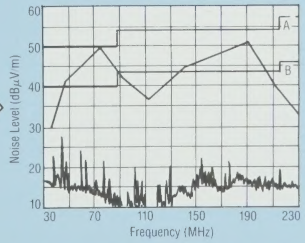
Initial Noise Level



Case mounted conventional 2-terminal capacitor on P.C.B. (There is only slight effect on noise over 30MHz.)

The diagram below shows test fixture for comparison charts illustrated.





Case mounted PLI-C type AC noise filter incorporating EA type. (Noise over 30MHz is fully suppressed.)

muRata ERIE®
MURATA ERIE NORTH AMERICA

5 Fraser Avenue
Trenton, Ontario
Canada K8V 5S1
Tel: (613) 392-2581
Telex: 06-62279
Panafax: (613) 392-0701

Regional Sales Offices:
Northeast — 617-245-7880
Southeast — 407-644-0954
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Western — 818-701-9702

Corporate Address: 2200 Lake Park Drive, Smyrna, GA 30080 (404-436-1300)

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